

'Forest killer' plant study explores rapid environmental change factors

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It's called mile-a-minute weed or "forest killer." *Mikania micrantha* is an exotic, invasive species that spreads quickly, covering crops, smothering trees and rapidly altering the environment.

Researchers at Arizona State University are spearheading a four-year research project that will explore what factors cause people and the environment to be vulnerable to rapid environmental change, such as an invasion by Mikania. Study findings likely will serve as a harbinger of the future as humans increasingly experience abrupt, [extreme conditions](#) associated with [climate change](#), said Sharon J. Hall, the study's co-principal investigator and Arizona State University School of Life Sciences associate professor in the College of Liberal Arts and Sciences.

"There are many communities that have to deal with and adapt to rapid change. Mikania is just one example. We're looking at how social and ecological forces in communities make them more resistant or vulnerable to rapid environmental change," Hall said. "Mikania is considered one of the world's worst invader weeds, and it is having a significant impact on agriculture in India and China. If there are [crop species](#), it will grow over them. It grows extremely fast, up and over trees, as quickly as three inches per day."

The study, "Feedbacks Between Human [Community Dynamics](#) and Socioecological Vulnerability in a Biodiversity Hotspot," examines how the social and [natural ecosystem](#) surrounding Chitwan [National Park](#) of Nepal is being threatened by [invasive plant species](#). It is funded by a

\$1,449,521 grant from the Dynamics of Coupled Natural and Human Systems program of the National Science Foundation.

Researchers will conduct the study in an area covering approximately 20 square miles in forests surrounding Chitwan National Park, a protected area that is home to many endangered species, including [Bengal tiger](#) and one-horned rhinoceros. The park borders populous communities and forests that the people use in their daily lives.

The study will also examine what people are doing to spread *Mikania* and how the plant affects people's lives. Collaborators on the study include: Abigail York, co-principal investigator and ASU School of Human Evolution and Social Change assistant professor; Li An, San Diego State University; Dirgha Ghimire, University of Michigan; Jennifer Glick, ASU School of Social and Family Dynamics professor; and Sean Murphy, CABI, an international non-profit organization focused on solving agricultural and environmental problems through scientific expertise.

"What sets our research apart from most previous work on [invasive species](#) and human populations is that we are taking an integrated approach to examining the environment, people, and society at many different levels: individuals, households, landscapes, community governance organizations, and so-called 'non-family organizations' like marketplaces/stores, schools and employers," said Scott Yabiku, the study's principal investigator and ASU School of Social and Family Dynamics associate professor in the College of Liberal Arts and Sciences.

Researchers are integrating a holistic, use-inspired approach into their study by observing and documenting the problem, using experimentation to tease apart driving forces, and implementing an intervention to reduce the spread of the species throughout the 21 community forests that

border Chitwan National Park. Examining how people affect the forest's health and how the forest affects resident's livelihood will vary from an individual level to how forest management groups are addressing the problem.

"Not only are we thoroughly studying the social and ecological system surrounding the Chitwan National Park, we will also conduct experiments that test if an educational intervention with community forest groups can slow the spread of invasive species," Yabiku said. "At the end of the project, we'll implement this intervention in all remaining forest groups in the study area in the hopes that it has an impact on the well-being of the forests that these people rely on."

Mikania is a challenging adversary that can regenerate from dropping a small piece onto the soil. Possible interventions that may be implemented include carefully bagging the plant before removing it from the forest. Another practice that bears examination is use of fire in forest management, as this activity creates a nutrient rich environment that may encourage the spread of Mikania.

Provided by Arizona State University

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